special case is a variant of Choquet's existence theorem for distributions of random closed sets in locally compact second countable Hausdorff spaces S. Our approach to this result shows that it holds as soon as the topology of S is continuous and second countable. We also obtain characterizations of the distributions of all random compact and all random compact convex subsets in R^d for finite d.

Some Properties of Westcott's Functional

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For random measures on locally compact spaces the so-called Laplace functional is the appropriate generalization of the classical Laplace transform. These functionals may be characterized by positive definiteness and a weak continuity property. A certain sharper version of positive definiteness will be shown to single out the Westcott's functionals, i.e. the Laplace functionals of joint processes. A stronger continuity requirement characterizes finitary point processes.

Subordination of Stationary Processes

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Let $X=\{X(t), t\in T\subset \mathbb{R}\}$ be a stationary process and suppose that $N=\{N(t), t\geq 0\}$ is an infinitely divisible process, independent of X. Then the process $\hat{X}:=\{\hat{X}(t)=X(N(t)), t\geq 0\}$ is called subordinated to X (or derived from X) with subordinator N. We show that $\hat{X}$ is again a stationary process and we relate the spectral properties of X and $\hat{X}$ by comparing their spectral measures. We obtain among others that if X is stochastically continuous

$$\hat{f}(x)=\frac{1}{\pi}\int_{-\infty}^{\infty}\frac{\operatorname{Re}\varphi(u)}{(\operatorname{Re}\varphi(u))^2+(x+\operatorname{Im}\varphi(u))^2}f(u)\,\mathrm{d}u,\quad -\infty<x<\infty.$$

Here f and $\hat{f}$ are the resp. spectra of X and $\hat{X}$ and $\varphi(u)=-\log E(\mathrm{e}^{\mathrm{i}uN(1)})$. We also discuss the possibility of a derived stationary process to model time series in random time domains and give several examples.

2.9. GSMPS's *and insensitivity*

Insensitivity with Interruptions

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The theory of insensitivity within Generalised Semi-Markov Schemes is extended to cover classes of models in which the generally distributed lifetimes can be terminated prematurely by the deaths of negative exponentially distributed lifetimes. As a consequence of this approach it is shown that there exists classes of processes which are insensitive with respect to characteristics of the general distributions other than the mean. A variety of examples is given. One models the interaction between bushfires and vegetation in remote forest regions. The others analyse queues in which the generally distributed service times are interrupted in either an abort or a restart fashion.

Remarks on the Basic Equations for a Supplemented GSMP and its Applications to Queues

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A supplemented GSMP (Generalized Semi-Markov Process) is known as a useful stochastic process for discussing fairly general queues including queueing networks. Although much work has been done on its insensitivity, there were only a few works on its general discussion. This paper considers a supplemented GSMP in general setting. Our main concern is a system of Laplace-Stieltjes transforms of the steady state equations called the basic equations. The difference between the basic equations and the ordinary ones is that the former use Palm distributions of point processes. We first derive the basic equations under the stationary condition based on theory of point processes. It is shown that those basic equations with some additional conditions characterize a stationary distribution of GSMP. That is, they give a generator of a supplemented GSMP. We also discuss how to get the stationary distribution when a solution of the basic equations is partially known or inferred. This includes an important remark to the fact by which we are liable to be trapped. Some examples of queues are given which includes a counter example to the literature.

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Insensitivity and Generalised Transition Rates

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We consider a process P on a set of states $\mathcal{S}$, and A is a subset of $\mathcal{S}$. Utilizing Whittle's concept of insensitivity, we suppose that upon jumping into the set A the